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polar circle diagram. In translating Professor Blondel's "Moteurs Synchrone," Mr. Mailloux has rendered a valuable service to English-speaking electrical engineers.

RALPH R. LAWRENCE

Storage Batteries. By HARRY W. MORSE.
New York, The Macmillan Company. 1912.

This little book of 263 pages on storage batteries is based upon lectures given by Professor Morse at Harvard University. It deals only with the theory and the characteristics of storage batteries. No attempt is made to discuss problems connected with storage-battery engineering. The first chapters are devoted to the laws underlying the action of storage cells and to the consideration of the fundamental reactions. A short discussion of the ionic theory and the energy relations involved in the action of a storage cell is included. Later chapters are given up to the operating characteristics, efficiency and capacity, and to the general principles underlying the methods of forming modern storage battery plates. The diseases and care of storage batteries are also discussed. In the last chapter a few pages are devoted to the iron-nickel-alkali cell. "Storage Batteries" is an excellent little book for any one who wishes a simple treatment of the theory, action and care of lead-lead-peroxide storage batteries.

RALPH R. LAWRENCE

SPECIAL ARTICLES

CORRELATION BETWEEN EGG-LAYING ACTIVITY AND YELLOW PIGMENT IN THE DOMESTIC FOWL¹

In the Leghorns and the so-called American breeds, such as the Plymouth Rocks, yellow, in the form of yellow fat,² is present in varying amounts in the legs and beak. In these breeds, individual birds may undergo considerable change in the amount of the yellow pigment visible. The paling or yellowing of the

¹ Paper presented before the American Society of Naturalists, Philadelphia, December 31, 1914.

² Barrows, H. R., "Histological Basis of Shank Colors in Domestic Fowl," Bull. 232, Maine Agric. Exper. Station, 1914.

legs has been attributed by poultrymen to various environmental factors. Of recent years, some individual poultrymen, however, have claimed that paling of the legs is due to heavy laying.³ The requirements of the "Standard of Perfection," which controls judges in the show room, as well as the common practise of poultry breeders, are opposed to a belief in any connection between laying and leg color. Woods⁴ under the title, "Has Leg Color Value Indicating Layers?" in the most recent discussion of the subject, concludes:

Personally we believe that, as a practical guide in the selection of heavy layers, . . . the leg color of itself has no real value.

So far as the writers are aware, no published data are available which show in how far the leg color may be of any value in selecting the laying hen, and such suggestions as have been made in this connection have confined themselves almost entirely to a consideration of the legs alone. The results tabulated in the present paper show conclusively, it is believed, that a close connection does in fact exist between the yellow pigmentation in a hen and her previous egg-laying activity, and that, in Leghorns, the color of the ear-lobes is perhaps a better criterion of laying activity than either legs or beak and is more readily recorded.

The hens investigated were in the egg-laying contest at Storrs, Conn., and were handled essentially alike. The influence of environmental factors, therefore, can be largely neglected. The amount of yellow was measured by means of the Milton Bradley color top, which, when spinning, acts as a color mixer. The top readings were taken of the White Leghorns listed in Tables I. and II. at three different periods in October.

In Table I., the records at the three different readings have been used. A bird laying on the day of record, or on a later day within the month is considered to be laying and credited

³ Rice, J. E., Circular 11, p. 42, N. Y. State Dept. of Agriculture, 1910; Barron, Tom, *Connecticut Farmer*, September 12, 1914; Circular 499, Maine Agric. Exper. Station. This is listed as an abstract of Bull. 232.

⁴ Woods, P. T., *Amer. Poultry Jour.*, p. 35, January, 1915.

TABLE I
Percentage of Hens Laying and Average Number of Days since Laying for Different Amounts of Yellow in Ear-lobes

Per Cent. Yellow	5-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60	61-65	66-70	71-75
No. records	41	125	80	67	62	92	94	94	108	84	44	28	9	4
Av. days since laying....	0.4	1.6	7.3	17.1	26.2	37.9	41.5	44.0	45.1	51.3	55.9	61.4	50.3	71.0
No. records=laying.....	36	98	44	17	3	0	1	0	2	0	0	0	0	0
Per cent. records=laying	87.8	78.4	55.0	25.4	04.8	0	01.0	0	01.9	0	0	0	0	0

White Leghorns. Total number of records, 932; total number of birds, 317

with a zero. If she laid on the day before the record but not later, she is credited with one "day since laying" and in a similar way a longer period of inactivity in laying is indicated by a larger number of days since laying. With the exception of a few cases where this is not possible three records were taken of each bird. Since October is the season of decreasing egg production, the majority of the birds increased their quantum of yellow and consequently most birds are listed in more than a single color grade. Beginning with the 41 records in

be seen that in general as the percentage of yellow increases the egg production falls off, and that the correlation is most marked during the periods nearest the time when the records were taken. A distinct correlation with color seems to show in the yearly averages but is largely an indirect one. It is generally only the best birds—those that make the large yearly records—that are laying in October. Therefore, any method that selects the laying birds at this season will select at the same time the birds laying above average

TABLE II
Average Egg Records for Different Amounts of Yellow in Ear-lobes of 312 White Leghorns

Per Cent. Yellow	5-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60	61-65	66-70	71-75
No. birds	7	36	40	16	20	31	33	41	39	30	13	4	1	1
September	19.7	18.2	16.9	16.4	10.3	5.5	6.1	4.9	4.0	3.6	2.4	1.3	0.0	0.0
October	15.3	14.2	11.7	8.1	3.2	0.5	0.2	0.2	0.2	0.1	0.0	0.3	0.0	0.0
Year	197.1	187.9	184.3	164.3	148.5	139.1	139.6	134.2	138.2	137.8	124.7	100.8	70.0	83.0

the 5-10 per cent. color grade, which show an average of only 0.4 days since laying, the number of days increases consistently with the amount of yellow in the ear-lobes. The percentage of records that indicate actual laying drops rapidly from 87.8 per cent. for 5-10 per cent. yellow to zero for grades of yellow above 30 per cent. The three cases of laying among records above 30 per cent. yellow were for sporadic layers. The table shows that it is practically certain that a bird with an ear-lobe showing more than 30 per cent. yellow at the time of the records is not in a laying condition.

Table II. shows the percentage of yellow in the ear-lobes of 312 birds according to the color records of October 20, together with egg records for the different color groups. It will

throughout the year, and consequently give high yearly totals. It will be observed that 30 per cent. seems to be a critical amount of yellow. Above this amount comes the sudden drop in egg production for the months of September and October and also above 30 per cent. yellow the yearly totals fall to between 130 and 140 with but slight change thereafter.

By the use of beak and leg color, similar results to those shown in Tables I. and II. have been worked out for other breeds than Leghorns and more complete data are being published elsewhere.

The data presented indicate a connection between the amount of yellow pigment showing in a hen and her previous laying activity. The most natural assumption is that laying removes yellow pigment with the yolks more

rapidly than it can be replaced by the normal metabolism, and in consequence, the ear-lobes, the beak and the legs become pale by this subtraction of pigment.

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PROCEEDINGS OF THE ANNUAL MEETING
OF THE AMERICAN SOCIETY OF
ZOOLOGISTS HELD IN PHILA-
DELPHIA 1914

THE American Society of Zoologists, in conjunction with the American Society of Naturalists and Section F of the American Association for the Advancement of Science, held its twelfth annual meeting (the twenty-fifth annual meeting of the society since its establishment as the American Morphological Society) in the zoological laboratory of the University of Pennsylvania, Philadelphia, Pennsylvania, on December 29 and 30, 1914.

At the session for transacting business, held on the afternoon of December 30, the following officers for the society were elected for the year 1915:

President—William A. Locy, Northwestern University, Evanston, Ill.

Vice-president—William E. Ritter, Scripps Institution, La Jolla, Cal.

Member at large of the Executive Committee—D. H. Tennent, Bryn Mawr College, Bryn Mawr, Pa.

Upon the recommendation of the executive committee the following persons were elected to membership in the society:

Cora J. Beckwith, assistant professor of zoology, Vassar College; Ralph V. Chamberlain, museum of comparative anatomy, Harvard University; Margaret H. Cook, instructor in zoology, Wellesley College; J. A. Detlefsen, assistant professor of genetics, University of Illinois; Howard E. Enders, associate professor of zoology, Purdue University; Nathan Fasten, instructor in zoology, University of Washington; Richard B. Goldschmidt, in charge of department of genetics, Kaiser Wilhelm Institut für Biologie, Berlin (Yale University); Joseph Grinnell, director, museum of vertebrate zoology, University of California; Carl G. Hartman, adjunct professor of zoology, University of Texas; Mildred A. Hoge, instructor in zoology, Indiana University; A. G. Huntsman, lecturer in biology, University of Toronto; B. F. Kingsbury, professor of histology and embryology, Cornell University; F. H. Kreeker, assistant professor of zoology, Ohio State University; K. S. Lashley, Adam T. Bruce Fellow, Johns Hopkins University; W. H. Longley, professor of botany, Goucher College; Elmer J. Lund, instructor in zoology, University of Pennsylvania; Roy L. Moodie, instructor in anat-

omy, University of Illinois; Julia E. Moody, instructor in zoology, Wellesley College; Anna H. Morgan, associate professor of zoology, Mount Holyoke College; T. S. Painter, instructor in biology, Yale University; B. M. Patten, instructor in histology and embryology, Western Reserve Medical School; B. H. Ransom, chief, zoological division, Bureau of Animal Industry, Washington, D. C.; E. E. Reinke, instructor in zoology, Rice Institute, Houston, Texas; Lucy W. Smith, instructor in zoology, Mount Holyoke College; A. H. Sturtevant, Cutting Fellow, Columbia University; Shiro Tashiro, instructor in physiological chemistry, University of Chicago; Ernest I. Werber, assistant in biology, Princeton University; Paul S. Welch, assistant professor of entomology, Kansas State Agricultural College.

The secretary-treasurer of the society was authorized to prepare and print a list of the names, addresses, etc., of the members and officers elected at this meeting and any corrections or additions needed to be made to the published list of members, and to distribute copies of the same to all members. He was also instructed to secure and distribute to members reprints of the proceedings of the Philadelphia meetings when the same shall have been published in *SCIENCE*.

The committee on premedical education, appointed at the last annual meeting, submitted no report and it was continued with instructions to report at the annual meeting in 1915.

The executive committee, to which the "Matthews Plan for the Organization of an American Biological Society" was referred last year for consideration and report to a future meeting, asked and was granted more time for this work.

The question of holding a mid-year meeting of the society, as a whole, in San Francisco in connection with the Panama Exposition was considered and, upon motion by Professor R. G. Harrison, the society took the following action: "The American Society of Zoologists urges its members who reside on the Pacific coast to form a section of the society, such as is provided for by the constitution, and that this section cooperate in organizing and holding a zoological meeting in San Francisco in connection with the Panama Exposition, and it assures these members of the sincere interest and approval of the society in such an undertaking."

A committee on resolutions on the death of Professor Charles Sedgwick Minot and Professor Seth Eugene Meek, consisting of Professors Frank R. Lillie, R. G. Harrison and H. V. Neal, was appointed and instructed to prepare resolutions and publish the same in *SCIENCE* and to transmit copies to the families of the deceased members.